

Is the Mbili – Mbili technology a solution to low legume productivity?

Background

Getting smallholder households out of hunger, extended months of food insecurity, chronic malnutrition and poverty particularly in women, youths and children, requires raising of legume productivity from the current low amounts in SSA. Within the context of the Africa RISING project, a new technological innovation is emerging. Taking a step back, significant work has been done to develop practices that increase maize productivity, with good success. However, legume productivity remains low, as low as <250 kg/ha for beans and <400 kg/ha for pigeonpeas. Recognizing this, CIAT developed an integrated intervention that is now being validated in Babati, Tanzania. The specific focus is to increase the productivity of pigeon pea and beans (legumes) without impacting productivity of maize crop.

The intervention, gaining popularity as “Mbili Mbili” involves exploiting the manipulations of plant spatial configurations to increase light penetration to the legumes, often times shaded by cereals. The name Mbili Mbili is derived from Swahili word “Mbili” meaning two, in our case two maize rows alternating with two legume species (Figure 1). This technology is tested among others such as usability of maize varieties with vertical leaf architecture, topping and stripping maize, in the common maize-legume intercropping system.



Figure 1: The Mbili – Mbili which is an innovative intercropping of maize, bean and pigeon pea.

How Does Mbili - Mbili Work?

This technology is an improvement of the “Mbili” innovation developed in Kenya in 2002. This involves maize planted as two rows closer to each other (spacing of 50 cm) leaving a large space before the next two maize rows, in which two rows of legumes are planted to match the “doubled-up” legume innovation validated by Africa RISING in Malawi. Similar to doubled-up legume, Mbili - Mbili produces two intercropped legumes (pigeon pea and beans), with reduced competition for light, moisture and nutrients while maximizing the utilization of land and labor for increased crop yields.

Benefits of the Mbili - Mbili technology:

Besides food production and nutritional benefits, integration of legumes in cereal systems also;

- Improves soil fertility through atmospheric nitrogen fixation and reduces dependence on nitrogenous fertilizers that form a significant expense for resource poor farmers.
- Is a climate smart system offering staggered harvests, beginning with beans, maize and pigeon pea. Besides, the system can accommodate an additional bean cycle after the first harvest.

- Minimizes the period of cattle on the crop land and their effects on soil physical degradation due to the growing period of the pigeon pea that extends into the dry season.
- Increases year round soil cover due to the different growth cycles of the three crops established in this system which helps to reduce soil erosion and nutrient leaching.



Plate 2. Doubled-up legume and Mbili - Mbili system on the background. Photo credit: Job Kihara

Mbili – Mbili trials:

The initial trials were initiated in Babati, Tanzania in six farmer fields. The results are very promising with higher gross margins following the improved spatial configurations relative to sole maize systems. Forty farmers are already testing the practice in their own fields and plans to assess household experiences after two seasons of rolling out the technology have been put in place. This intervention will:

1. Expand basket of options of cropping systems for farmer
- 2 Increase household food security and profitability.

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